ATOMIC ENERGY Newsletter

THE FIRST AND ONLY ATOMIC [illegible] SERVICE

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Dear Sir:

Design and construction of "atomic" installations will be studied by architects, contractors and manufacturers at an October conference in Washington, D. C., co-sponsored by the American Institute of Architects, and the USAEC. The meeting will be conducted by the Building Research Advisory Board of the National Research Council. Design of "hot" laboratories for industrial research universities, and hospitals; building materials and surface finishes; problems of shielding from radioactivity; and disposal of radioactive wastes are among conference topics.

A five-day International Conference on Nuclear Physics and Fundamental Particles will be sponsored next September by the University of Chicago's Institute for Nuclear Studies. Invitations to the Conference have been sent out to more than 100 leading physicists, including 25 foreign scientists. Ten major papers at the Conference will deal with nuclear physics and the physics of fundamental nuclear particles, with emphasis on research conducted with high energy particle accelerators. Funds for the conference are being supplied by the Office of Naval Research and the USAEC.

Six of the European physicists who are coming to this country in September (as above) will conduct a two-day nuclear physics symposium at Oak Ridge, Tenn., Sept 13 and 14. Symposium leaders will include: Prof. E. Amaldi, University of Rome; Prof. J. Rotblatt, University of London; Prof. R. E. Peierls, University of Birmingham; Prof. S. Devons, Imperial College of Science and Technology, London; Prof. P. Huber, University of Basel; and Prof. J. Mattauch, University of Bern. The symposium, which is unrestricted in nature, is being given under the joint sponsorship of Oak Ridge National Laboratory and the Oak Ridge Institute of Nuclear Studies. Interested physicists and others are invited to attend; there is no charge. Inquiries should be directed to the Institute, at P. O. Box 117, Oak Ridge.

Two sub-contracts for electrical and plumbing work have now been let by du Pont in the construction of the new $900 million hydrogen bomb materials plant in South Carolina (Savannah River Plant) on which du Pont holds the prime contract for design, construction and operation. The sub-contract for electrical installations is with the Miller Electric Co., Jacksonville, Fla., which has entered into a joint venture with the Dunn Electric Co., Columbia, S. C. The piping and plumbing installation is with the B. F. Shaw Co., Wilmington, Del.

A new program of research on flash burns which might result from exposure to an atomic explosion will be conducted by ten universities and medical schools, with funds for the work supplied through the Office of Naval Research, the sponsoring agency. The program will encompass the chemical, physiological, and biophysical aspects of burns.

Subscription rates: United States, U.S. possessions, and Canada, $18.00 a year. Latin America, $20.00 a year. All other countries, $25.00 a year.

NEW PRODUCTS, PROCESSES & INSTRUMENTS... for nuclear work.....

A new low-priced Geiger counter for use as a civilian defense instrument, as well as for prospecting and school use; called by manufacturer the "Snooper". Housed in plastic case; radioactive indications through earphones, supplied with device. Size: 1½" x 3" x 5". Weight: 1¼-lbs.--Precision Radiation Instruments, Los Angeles 16, Calif.

Now available, and already widely used, according to the manufacturer, is this concern's vertical iron shield. With a hinged door, the shield has an equivalent lead thickness of 1¼-in., and has lower remanent radioactivity than lead. Internal diameter of 5-1/8 in., and internal height of 9-3/4 in.--Radiation Counter Laboratories, Inc., Chicago 8, Ill.

Automatic absorber changer attachment, model E-25, converts this firm's automatic sample changer to an "absorber" changer and makes it possible to obtain absorption curves automatically.....Cobalt-60 source strengths available from this firm have now been expanded from 2 to 19. Strengths supplied now range from 50 mc to 25 curies.... Portable radiation survey meter, model SU-1E, with new features, manufacturer states. Said to incorporate new circuit designed in cooperation with National Research Council of Canada (Chalk River), to make full use of the principle of inverse feedback.--Tracerlab, Inc., Boston 10, Mass.

NOTES- Tracerlab, Inc., Boston nuclear products manufacturer and processor, is currently filling the first sizable order placed by the Veterans Administration for atomic radiation survey instruments. The contract, totalling approximately $25,000.00, calls for delivery of 152 radiation survey meters to Veterans Hospitals all over the country for use by them in the event of an atomic bombing. The instrument being delivered is a portable battery operated device, which measures gamma radiation on one of five scales to a high of 50 r/hr.

BOOKS & OTHER PUBLICATIONS...in the nuclear field...

Radiochemical Studies: The Fission Products. (Book 1, Parts I, II, III & IV. Book 2, Part V. Book 3, Part VI, VII, & VIII.) Edited by C. D. Coryell and N. Sugarman. Comprises 336 original research papers on the techniques and radiochemical studies of uranium and plutonium fission products. (Part of the National Nuclear Energy Series.)--McGraw-Hill Book Co., New York 18, N.Y. (Set of 3 books: $18.50)

Advances in Biological and Medical Physics. Vol. 2. Edited by John H. Lawrence and Joseph G. Hamilton, University of California, Berkeley. Contents: Biological effects of radiations with special regard to neutrons; Molecular exchange and blood perfusion through tissue regions; Applications of the carbon isotopes to a study of animal metabolism; Radiographic technique; Carcinogenic effects of radiation; In Vivo studies with radioisotopes; Radioactive isotopes in clinical diagnosis; Biophysical approaches to atherosclerosis; radioactive sulfur and its applications.--Academic Press, Inc., New York 10, N.Y. ($7.80)

NOTES-Translation of Swiss patent no. 233,011, entitled "Device for transforming nuclear energy into another form of energy", and issued to Centre National de Recherche Scientifique (Belgium), is now available from Library of Congress, Photoduplication Service, Washington 25, D.C. Comprising 27 pages including drawings, either the microfilm version ($2.00) or photostats ($3.75) may be obtained.

New catalogue and price list, dated March, 1951, has now been made available by Isotopes Division, USAEC, Oak Ridge, Tenn. Some 75 pages in length, it covers policies, procedures and services of interest to those now using or who contemplate using isotopes.

Latest USAEC publications available from Office of Technical Services, Washington 25, D.C., are: (1) Synthesis of leucine; UCRL 935. 10¢ (2) Tolerable concentration of product in drinking water; AECD 2906. 5¢ (3) Tolerable concentration of radioiodine in edible plants; AECD 2907. (4) On basic concepts in surface dynamics; AECU 880. (5) X-ray spectra from radioactive decay of transuranium elements; AECD 2944. 10¢

ATOMIC ENERGY & CANCER. A special digest of remarks by USAEC Commissioner Sumner T. Pike at the dedication of the Cancer Research Institute, New England Deaconess Hospital, Boston, Mass., on June 5th, 1951.

As you know, radiation can cause cancer; it can diagnose cancer; and it is one of the few known methods for killing cancer. Many of the materials we work with in the atomic energy program are so-called internal emitters of radiation and have proved in experimental animals to be carcinogenic. Moreover, cell damage appears to be the basic effect of radiation upon living tissue and the subtle changes observed in irradiated cells are believed to be similar in many ways to changes observed in cancer cells. Investigation of cell growth and metabolism in an atomic energy laboratory may have direct application in a cancer research laboratory, and vice versa.

While this connection between cancer and atomic energy is very real, at budget time each year there arises the question of the extent to which the USAEC can properly support cancer research--particularly in the field of cancer treatment.

We have concluded that the USAEC can justify cancer research support whenever its unique facilities or materials are required for carrying out the research.

A few years back, it looked as if radioisotopes produced in reactors might be the means by which cancer could be eradicated.

Today we know that radioisotopes have very limited uses in treating cancer, although they are widely employed in cancer research. In a few cases of thyroid cancer, treatment with radioiodine has met with some success. However, radioiodine has been quite successful in treating hyperthyroidism, particularly when surgery would endanger the patient's life.

In polycythemia, marked by over production of red cells, radiophosphorous is the treatment of choice. Several investigators have reported favorably upon the use of radiophosphorous in locating deep seated tumors. While used to locate brain tumors, for this particular application, the dye, di-iodofluorescein, incorporating radioiodine, has proved more generally useful.

Recently, an experimental method for treating brain tumors with neutrons from a reactor was developed by Dr. Sweet of Massachusetts General Hospital, and Dr. Farr, of Brookhaven National Laboratory. The method utilizes boron, which is selectively absorbed by the tumor. Boron, when irradiated with neutrons, emits alpha particles. After receiving the boron, the head of the patient, shielded except in the vicinity of the tumor, is placed in the neutron beam, and the tumor receives an intense dose of induced alpha radiation.

Within the past month, investigators at Oak Ridge National Laboratory have reported that radiohafnium is selectively absorbed by the outer or cortical layer of the adrenal gland, the glands which seem to govern the functioning of many other organs of the body. This fact--that we may now have a tool by which we can control adrenal output in experimental animals--is of the highest medical significance.

There are a few other examples of selective absorptivity. Radiogallium, for example goes to the bone. Gallium is highly toxic, however, and in order to be effective, a very small amount must carry quite a wallop. Reactor produced radiogallium does not have this wallop. Investigators are now testing radiogallium produced by bombarding zinc in a cyclotron beam. In this way, they hope to get pure radioactive material which can be safely administered.

For medical purposes, however, radiocobalt promises to be the workhorse among the radioisotopes. This material can be made readily in the reactor. It has radiation characteristics very similar to those of radium, without some of radium's disadvantages. The gamma radiation from radiocobalt is equivalent in energy to that of a 2 million volt X-ray machine. The material is far cheaper than radium, and is easier to use than X-ray. Radiocobalt may be processed in the form of needles, or beads, to be placed directly in the diseased tissue, or it may be placed in applicators for irradiating sites deep within the body. Radiocobalt has proved so useful, in fact, that the demand, particularly for material of high specific activity, has outrun the supply.

ATOMIC PATENT DIGEST...latest U. S. applications & patents...

Additional U. S. patents (total: 26) have now been made available, to U. S. firms. Developed as a result of research in nuclear work, licenses, on a royalty-free, but non-exclusive basis, will be issued to U. S. firms. Inquiries should be directed to Patent Branch, USAEC, Washington 25, D. C. These patents follow. (1) A device useful in removing incrustations or sublimate from the interior of a vessel by an apparatus operable from the outside of the vessel through appropriate seals. U. S. Pat. No. 2,547,409. (2) A method of purifying hydrogen which comprises passing the hydrogen over a hydride of calcium or titanium at a temperature of at least 250-deg. C. U. S. Pat. No. 2,547,874. (3) An improved ion gauge of high sensitivity wherein the bombardment of the filament and the formation of a carbonaceous deposit thereon are minimized. U. S. Pat. No. 2,548,283. (4) An improved feedback amplifier, the sensitivity of which is adapted to be modulated in response to an introduced signal. U. S. Pat. No. 2,548,449. (5) An improved grid control for a corona discharge voltage regulator used to regulate the potential of the high voltage shell of a Van de Graaff electrostatic generator. U.S. Pat. No. 2,548,452. (6) Fluorinating organic compounds by injecting the organic compound and elemental fluorine into a molten mass of silver monofluoride and silver difluoride maintained at a temperature of 200-deg. C. to 500-deg. C. U.S. Pat. No. 2,549,565. (7) Method of manufacturing a cyclotron target of beryllium bonded to copper, which comprises bonding a beryllium plate or beryllium filings to a copper block by means of an intermediate layer of copper and beryllium, the bonding being accomplished by the use of pressure and heat. U. S. Pat. No. 2,549,596. (8) Fluorinated hydrocarbons, having the same carbon skeleton but differing from one another in the number of hydrogen atoms replaced by fluorine atoms, are separated by distillation in the presence of hydrogen fluoride to provide an overhead product containing two liquid phases. U. S. Pat. No. 2,549,609. (9) Preparation of neptunium tetrafluoride by contacting neptunium dioxide with hydrogen fluoride in the presence of an oxidizing agent at a temperature between 500-deg. C. and 1,000-deg. C. U. S. Pat. No. 2,549,899. (10) Production of perfluorinated alkanes by a process of progressive replacement of chlorine by fluorine in a halogenated aliphatic hydrocarbon by means of a pentafluoride of antimony or arsenic, with intermediate separation of more highly fluorinated fractions and inorganic salts, after which the highly fluorinated fractions are further treated with a higher fluoride of cobalt, silver or manganese. U. S. Pat. No. 2,549,988. (11) An anode supporting structure which will resist the corrosive action of fluorine and hydrogen fluoride in an electrolytic cell for manufacturing fluorine by fused salt electrolysis. U. S. Pat. No. 2,550,445.

(12) Monitoring circuit for parallel operated mercury-pool gas tubes which is designed to differentiate between arcback and misfire failures in the tubes and register the number of such failures. U. S. Pat. No. 2,550,460. (13) Pulse type survey instrument for detecting radiation using a proportional counter and using an amplifier of low gain for reducing microphonic effects. U.S. Pat. No. 2,550,448. (14) A simple pulsing system in which the amplitude of the output pulses may be made to vary cyclically in accordance with a predetermined pattern. U. S. Pat. No. 2,550,878. (15) A pulse amplitude discriminator responsive to pulses varying in amplitude and varying in rate, and so designed that the amplitude response characteristics may be adjusted without altering or impairing the rate of respondability. U. S. Pat. No. 2,551,529. (16) A gas-filled radiation counter so designed that a radioactive sample may be introduced without introducing any air or foreign gases. U. S. Pat. No. 2,551,531. (17) An improved vacuum pumping method with mechanical oil sealed pumps. U. S. Pat. No. 2,551, 541. (18) Fluorophotometer, for measuring intensity of fluorescence. U. S. Pat. No. 2,551,542. (19) Production of uranium peroxide by the simultaneous addition of hydrogen peroxide and a water soluble base, such as ammonium hydroxide, to a solution containing a uranyl salt in such a manner as to maintain a pH of 2.5. to 4.0. U. S. Pat. No. 2,551,543. (To be continued.)

Sincerely,

The Staff,
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